



VIRGINIA

COVID-19 Update January 14th, 2021

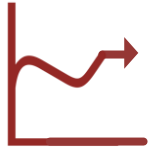
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A team of RAND researchers was asked by the Commonwealth of Virginia to review available information on COVID-19 models of the Commonwealth to determine the strengths and weaknesses of each model and their relevance to decisionmaking. The information in this presentation is intended to keep policymakers abreast of the latest findings of the research team.

This research was sponsored by the Commonwealth of Virginia and conducted by the RAND Corporation. RAND is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest. For more information, visit www.rand.org.



Bottom-Line Up Front



Virginia's total case levels remain very high and are rising

- Hospitalizations continue to rise rapidly
- Testing has risen but not fully kept up



Key triggers are likely to continue to drive high case levels for the coming months

- Seasonal changes
- COVID-fatigue
- New COVID variants

Cheaper, faster testing or a vaccine could reduce the spread upon widespread deployment



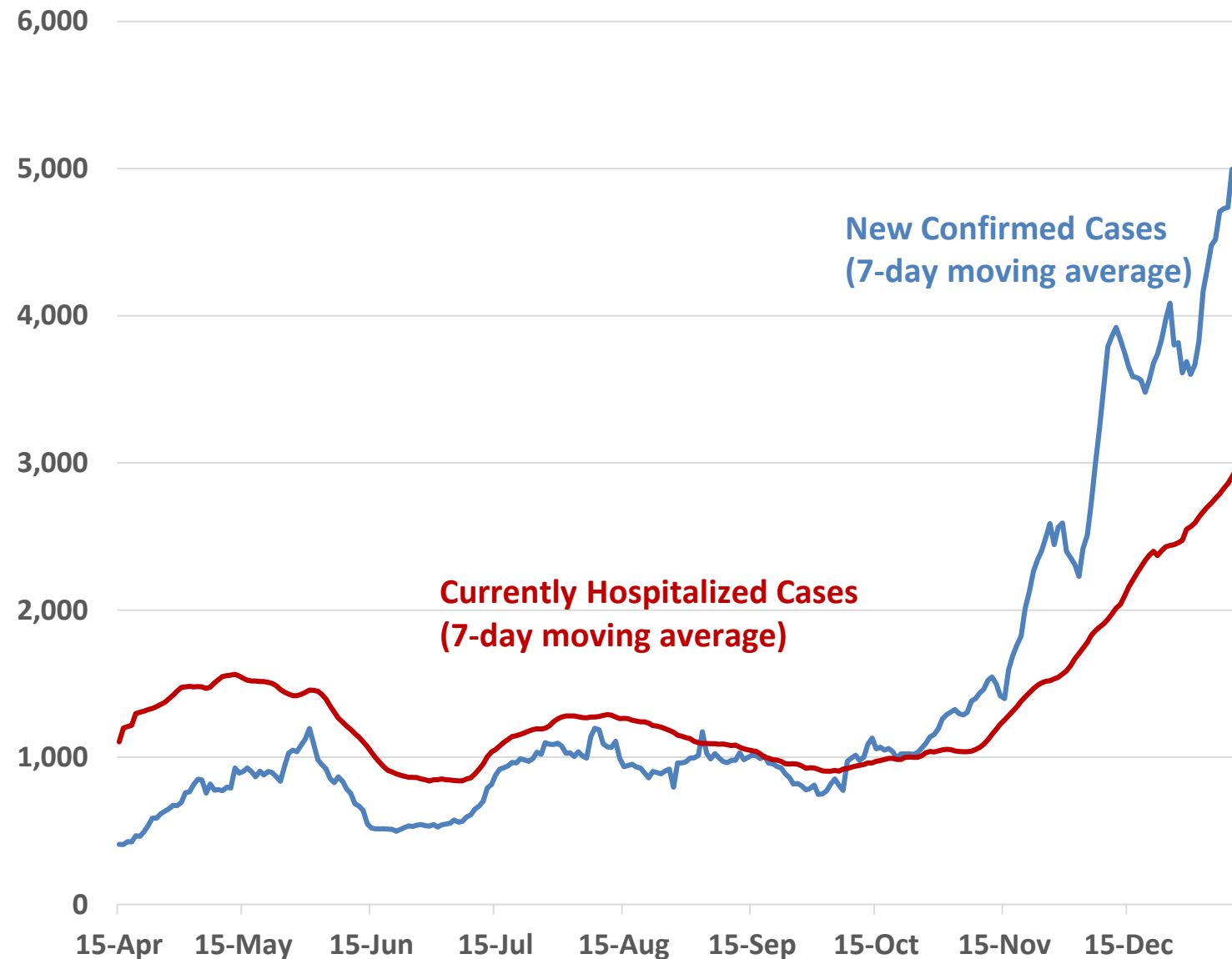
Model forecasts may be less accurate because behavior is driving growth

- Models will continue to be useful for comparing policies and exploring scenarios

Model based analysis could be very useful in informing policies related to vaccine distribution and the post-pandemic recovery



Cases remain high and hospitalization is growing rapidly



New confirmed cases are above 5,000/day on average

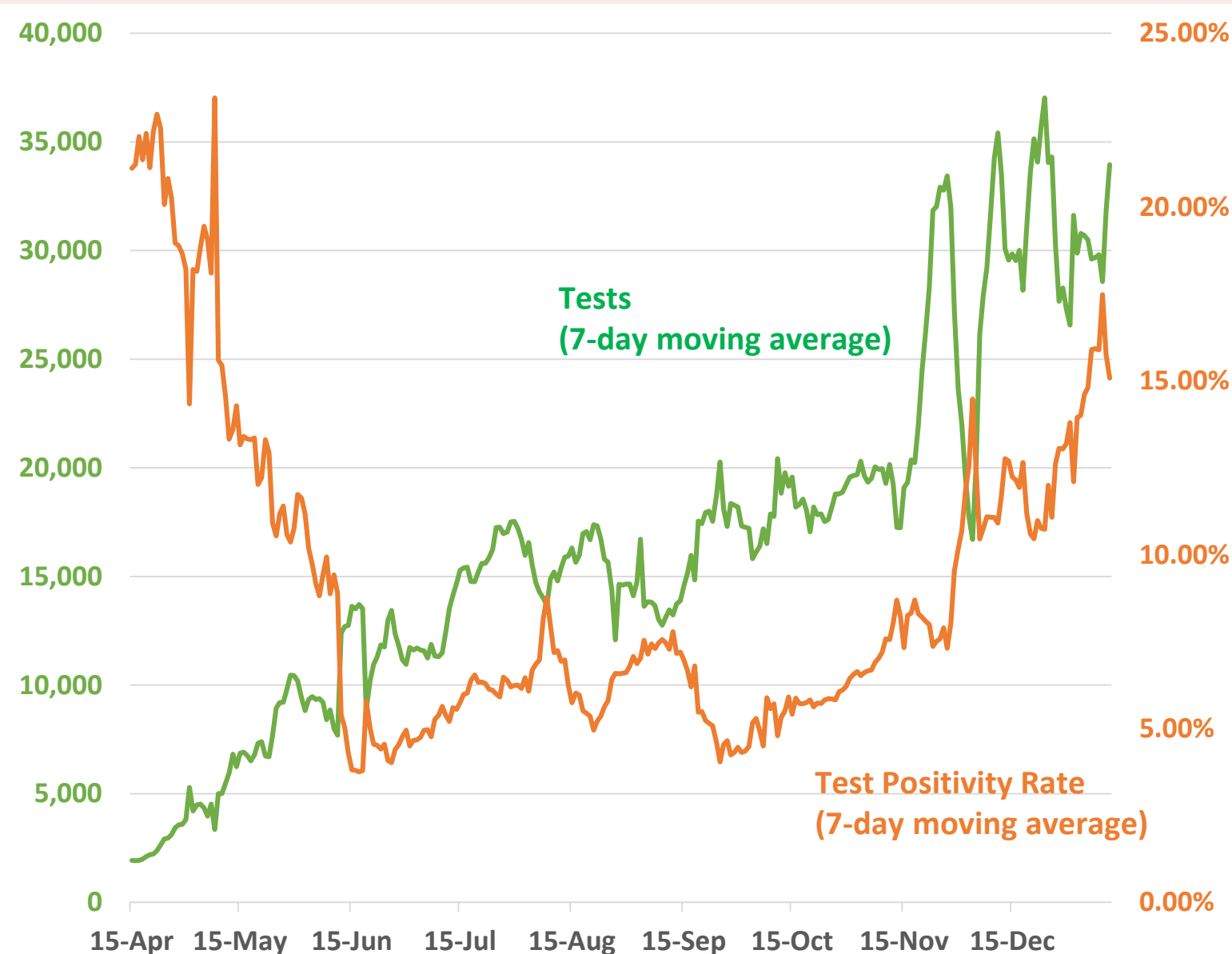
- Confirmed cases may be artificially lower for a couple of weeks because testing levels declined over the holidays

Currently hospitalized cases are rising

- Hospitalizations have been consistently increasing 11%/week since the start of November
- The seven-day average is 3,000 hospitalizations and rising
- The confirmed case trend indicates hospitalizations will continue to increase 10-20%



Testing remains high but is not keeping up with case growth



Tests per day have averaged nearly 35,000

- Testing increased substantially beginning at the end of October
- Testing has not moved much higher than 35,000

The test positivity rate is roughly 15 percent

- Five percent is a suggested target
- This would require close to 100,000 tests per day
- At a rate of fifteen percent, the case count levels are likely to be slightly less reliable



Two percent of Virginians have received the first shot

Age	0-9	10--19	20-29	30-39	40-49	50-59	60-69	70-79	80+	Total
Fully Vaccinated	0	22	2,418	5,169	4,481	4,102	2,511	357	26	19,086
% Full	0.0%	0.0%	0.2%	0.4%	0.4%	0.4%	0.3%	0.1%	0.0%	0.2%
Partially Vaccinated	0	778	22,839	32,979	32,329	33,762	23,750	8,114	7,679	162,230
% with Any	0.0%	0.1%	2.0%	2.8%	3.0%	3.0%	2.4%	1.3%	2.5%	1.9%
Cases	16,474	40,491	79,259	67,778	61,050	59,700	40,794	22,811	17,156	405,513
Susceptible	987,497	1,058,199	1,049,975	1,066,918	978,648	1,028,492	909,767	582,792	286,402	7,948,690
% with Antibodies	1.6%	3.8%	9.1%	9.0%	9.1%	8.7%	6.9%	5.1%	8.0%	6.9%

Source: VDH, January 12th

Vaccinations are being rolled out in Virginia

- 773,825 doses have been distributed, which is enough for 386,912 people (5% of Virginians) assuming no spoilage
- 181,316 (23% of the doses distributed to Virginia thus far) have been administered as of January 12th and, per FDA guidance, 19,086 have the second dose (0.2% of Virginians)

Vaccines doses are arriving faster than they are administered causing the stockpile to grow

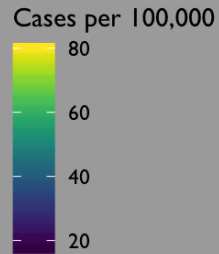
- The stockpile grew 56% from last week
- Stockpiles have a risk of spoilage



Case levels have continued to rise statewide

CASE COUNT

Source: VDH



Yellow indicates at least 80 cases per 100,000

Case levels across the Commonwealth rose substantially

- 87% of counties have more than 40 cases per 100,000
- 13% have more than 100 cases per 100,000

These data were updated January 12th and represent a seven-day average of the previous week

The spread has risen substantially in most neighboring states

Over the last 7 days, Virginia had 60.0 (+14% from last week) new confirmed cases per day per 100,000

Very high case loads (>20):

- Tennessee (94.4 new cases per 100k, +2% from last week)*
- Kentucky (84.9, +29%) *
- West Virginia (82.9, -1%)
- North Carolina (80.4, +19%)*
- Maryland (51.7, +31%)
- District of Columbia (42.3, +34%)

*Test positivity rates above 10%

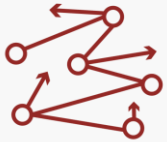
High case loads (10-20): None

Lower case loads (<10): None

These data were updated January 12th and represent a seven-day average of the previous week



We've been monitoring recent, relevant literature (1/2)



Johansson et al. modeled the spread of COVID-19 from people with and without symptoms

- Based on other studies on disease progression and transmission rates, they estimate 59 percent of transmission came from individuals without symptoms (35% from pre-symptomatic individuals and 24% from those who never have symptoms)
- Based on these rates, isolating the symptomatic population will not control the spread



Huang et al. followed 1,733 discharged COVID-19 patients from a hospital in Wuhan, China for six months following the onset of symptoms to determine the long-term effects

- This population constituted about 70% of the COVID discharges from the hospital with the remaining discharges declining to participate or being unable to participate
- Of the included population, 76 percent had some lingering symptoms including 63 percent who had fatigue or muscle weakness and 23 percent who had anxiety or depression



Pray et al. looked at the efficacy of antigen tests by comparing antigen and PCR test results for 1,102 people, both with and without symptoms, on two university campuses in Wisconsin

- The sensitivity was 80% for symptomatic cases, but only 40% for asymptomatic, though the specificity for both was over 98%
- This means that a negative antigen test of a symptomatic individual should be verified by PCR
- Further, they recommend a positive antigen test of an asymptomatic individual should be verified by PCR



CDC also released several short research notes (2/2)

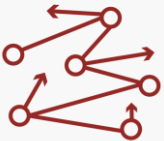
Atherstone et al. studied the likelihood of a positive test during quarantine for college athletes

- CDC partnered with the NCAA to examine retrospective data for 1,830 student athletes following a 14-day quarantine with routine testing in the summer of 2020
- For students who had not tested positive by the fifth day, 27 percent tested positive before the end of the quarantine; among those without a positive test by the 10th day, fewer than five percent tested positive before the end of the quarantine



Leidner et al. compared COVID incidence from July to September for counties with large universities or colleges based on whether remote instruction was being used

- The 22 counties with large higher education institutions relying on remote instruction saw an 18 percent decline in cases and the 3,009 counties without large institutions saw a 6 percent decline in cases
- For the 79 counties containing institutions using in-person instruction, cases increased 56 percent



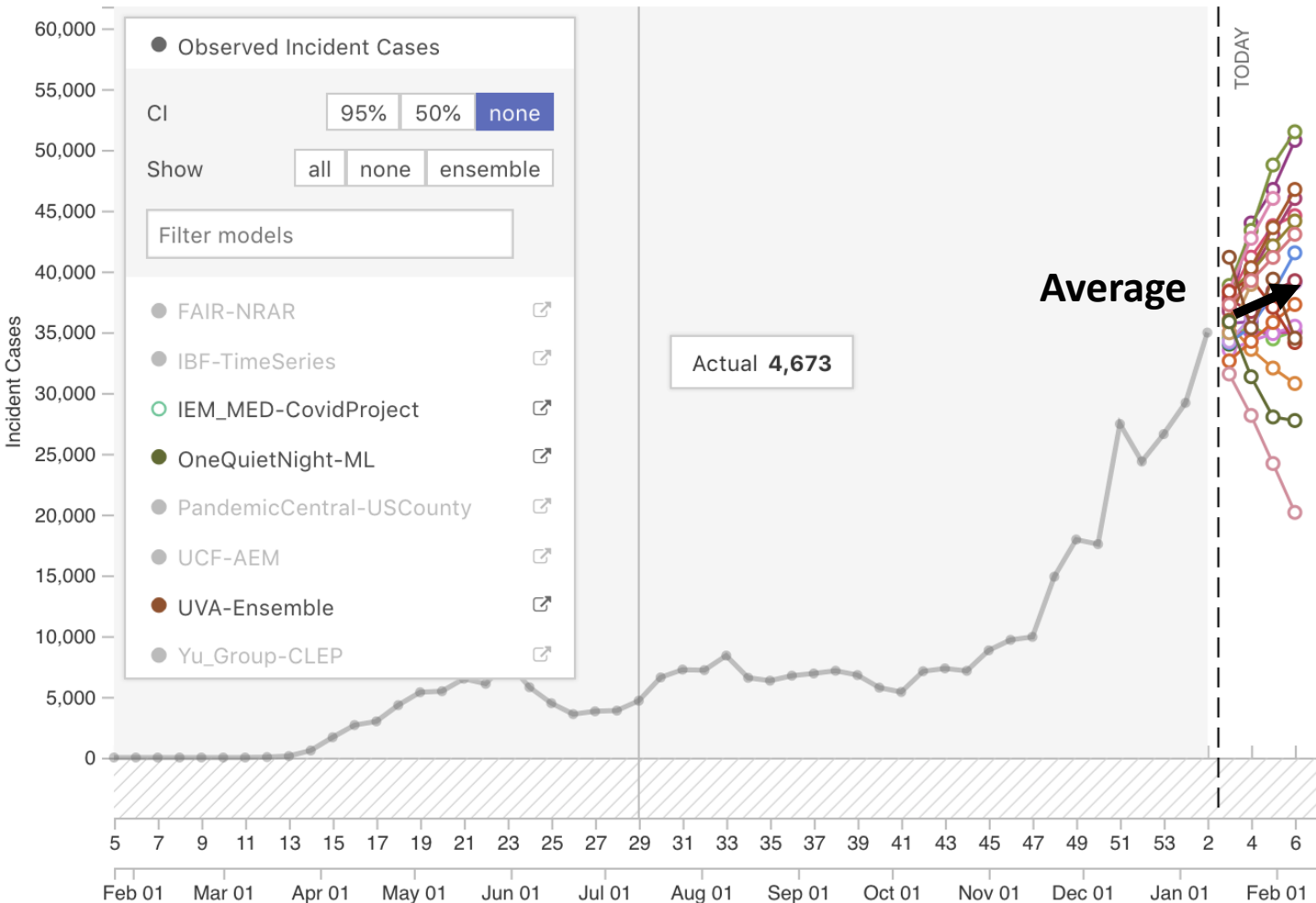
Vang et al. used network analysis to study the role of fraternity and sorority activities in the spread of COVID among university communities in Arkansas

- Sorority rush week began a week before fraternity rush week and included outdoor in-person activities
- Over the next two weeks, there were 965 cases associated with the university
- 72 percent of the gatherings linked to cases were associated with fraternities or sororities and women made up 70 percent of the confirmed and probable cases among students
- This implies that the sorority activities were a major source of the spread





Forecasts for cases vary but average to a small increase



Note: SEIR-type models have been cut from this figure due to poor fit
Source: COVID-19 Forecast Hub, <https://viz.covid19forecasthub.org/>
Accessed January 13th

There is substantial variation in the case forecasts

- The model “average” is for a small increase in the coming weeks

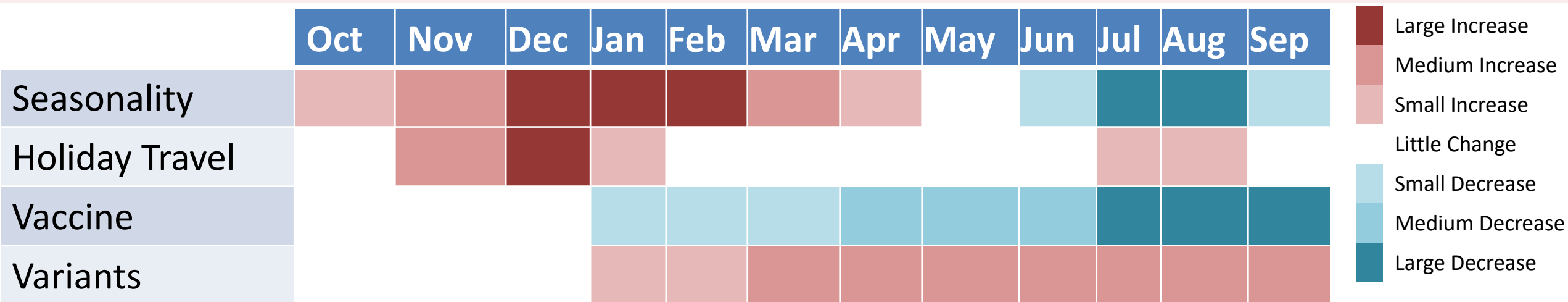
The mechanisms driving the spread at this stage are very different than in the early stage

- Initially, people did not change their behavior, so COVID spread exponentially
- Increased tele-work, changing weather, the return of in-person instruction, and other factors changed the pattern of spread
- These new patterns require the models to evolve

These models don't typically account for events such as Thanksgiving, Christmas, or New Year's and the related changes to behavior patterns

- Many models are not accounting for disruptions in testing data

There are several triggers that could lead to increased spread




There are several factors that will continue to drive the spread for the next few months

- Seasonal effects for COVID-19 appear to be driving spread as it gets colder
- Holiday activities appear to have increased spread but are largely over for now
- The vaccines are becoming available but are not being delivered in quantities sufficient to meaningfully reduce the spread for now
- The B.1.1.7 Variant of Concern may increase the rate of spread as it enters Virginia and future variants could also change the severity or the efficacy of vaccines

There are likely to be long-term repercussions that need planning and preparation to mitigate

- Several studies have documented long term negative health effects associated with COVID



Discussion and Questions